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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/733,741

12/10/2003

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FNL0202US

8392

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EXAMINER

CHU, RANDOLPH I

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

07/05/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/733,741	<b>Applicant(s)</b> KOEHLER ET AL.	
	<b>Examiner</b> Randolph Chu	<b>Art Unit</b> 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/7/2005</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1 - 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 1 recites the limitation "the candidate markers" in line 12 and 14. There is insufficient antecedent basis for this limitation in the claim. It is not clear that the candidate markers whether 1<sup>st</sup> set or 2<sup>nd</sup> set of candidate markers.

4. Claim 1 recites the limitation "the identified candidate markers" in line 15. There is insufficient antecedent basis for this limitation in the claim.

5. Claim 6 recites the limitation "the coordinates" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Art Unit: 2624

6. Claim 6 recites the limitation "the corresponding candidate markers" in line 4. There is insufficient antecedent basis for this limitation in the claim. It is not clear that the candidate markers whether 1<sup>st</sup> set or 2<sup>nd</sup> set of candidate markers.\

7. Claim 6 recites the limitation "the relation" in line 6. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 6 recites the limitation "the line distance parameter" in line 6. There is insufficient antecedent basis for this limitation in the claim.

9. Claim 7 recites the limitation "the histogram" in line 11. There is insufficient antecedent basis for this limitation in the claim. It is not clear which is the histogram of multiple histogram that appear above.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2624

2. Claims 1, 4, and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Brandt et al. ("Automatic Alignment of Electron Tomography Images Using Markers", Intelligent Robots and Computer Vision XIX, SPIE Preceding Series, Nov. 2000).

With respect to claim 1, Brandt teaches,

applying markers (small colloidal gold particle) to a sample to be imaged by the electron microscope (electron tomography) (abstract);

providing a tilt series of images of the sample (1. Instruction);

identifying a first set of candidate markers in each of the images in the tilt series (2. Initial Correspondence of Image);

attributing at least one probability parameter to each candidate marker in each image (2.1 Harris Corner Detector and 2.2 Matching Through Correlation and Relaxation);

selecting a second set as a subset of candidate markers from the first set of candidate markers on the basis of said at least one probability parameter (3. Epipolar Geometry);

projecting the candidate markers in the second set onto a sole image (4. Fiducial Marker Localization);

applying a fitting algorithm to determine a set of parallel straight lines (Fig 6.) or very elongate ellipses best fitting the candidate markers in the sole image (5. Marker Matching and Tracking);

aligning the images in the tilt series on the basis of the identified candidate markers (6. Parameter Optimization).

With respect to claim 4, Brandt teaches a cross correlation process is applied to the images of the tilt series (1. Introduction, 3<sup>rd</sup> paragraph).

With respect to claim 5, Brandt teaches probability parameter is derived from at least one of the quantities: size of the marker and local contrast of the marker (4. Fiducial Marker Localization, 2nd paragraph).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 2 is rejected under 35 USC 103(a) as being unpatentable over Brandt et al. ("Automatic Alignment of Electron Tomography Images Using Markers", Intelligent Robots and Computer Vision XIX, SPIE Preceding Series, Nov. 2000) in view of Russ (The Image Processing Handbook, CRC press, 1994, pages 495-500).

Brandt et al. teaches all the limitations of claim 1 as applied above from which claim 2 respectively depend.

Brandt et al. does not teach expressly that fitting algorithm used to determine the set of parallel straight lines comprises the Hough transformation.

Russ teaches fitting algorithm used to determine the set of parallel straight lines comprises the Hough transformation (Page 497).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use Hough transformation to determine the set of parallel straight lines in the method of Brandt et al.

The suggestion/motivation for doing so would have been that the Hough transform is superior because it minimizes the deviations of points from the line in a direction to the line, and it deals correctly with the case of the points not being uniformly distributed along the line.

Therefore, it would have been obvious to combine Russ with Brandt et al. to obtain the invention as specified in claim 2.

5. Claim 3 is rejected under 35 USC 103(a) as being unpatentable over Brandt et al. ("Automatic Alignment of Electron Tomography Images Using Markers", Intelligent Robots and Computer Vision XIX, SPIE Preceding Series, Nov. 2000) in view of Ballard ("Generalizing The Hough Transform to Detect Arbitrary Shapes", Pattern Recognition, Vol 13, No 2, page 111-122, 1981).

Brandt et al. teaches all the limitations of claim 1 as applied above from which claim 2 respectively depend.

Brandt et al. does not teach expressly that the fitting algorithm used to determine the set of parallel straight lines or to determine a set of very elongate ellipses is constituted by the Generalized Hough transformation.

Ballard teaches fitting algorithm used to determine the set of parallel straight lines comprises the Generalized Hough transformation.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use Generalized Hough transformation to determine the set of parallel straight lines in the method of Brandt et al.

The suggestion/motivation for doing so would have been that the Hough transform is superior it can detect an object with an analytic equation.

Therefore, it would have been obvious to combine Ballard with Brandt et al. to obtain the invention as specified in claim 3.

With respect to claim 7, Brandt teaches probability parameter is derived from at least one of the quantities: size of the marker and local contrast of the marker (4. Fiducial Marker Localization, 2nd paragraph).

With respect to claim 8, Brandt teaches probability parameter is derived from at least one of the quantities: size of the marker and local contrast of the marker (4. Fiducial Marker Localization, 2nd paragraph).



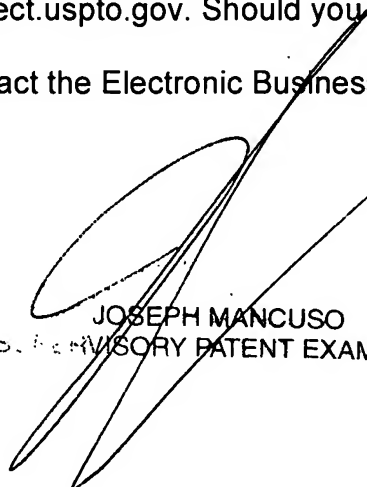
With respect to claim 9, Brandt teaches probability parameter is derived from at least one of the quantities: size of the marker and local contrast of the marker (4. Fiducial Marker Localization, 2nd paragraph).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randolph Chu whose telephone number is 571-270-1145. The examiner can normally be reached on Monday to Thursday from 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on 571-272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RIC/

  
JOSEPH MANCUSO  
SUPERVISORY PATENT EXAMINER